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(54) Collets for coupling devices

Befestigungsring für eine Kupplungsvorrichtung

Douille de serrage pour un dispositif de couplage

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Description

[0001] This invention relates to collets for tube couplings and is concerned with certain further improvements to the collets described and illustrated in EP-A-0756125.

[0002] In EP-A-0756125 (which is relevant only as an Article 54(3) EPC reference) tube couplings are described which comprises a coupling body having a throughway open at one end to receive a tube, a collet located in the throughway having an annular element and at least one radially resilient finger extending axially from the element towards said open end of the throughway. The coupling body has a stop face directed along the throughway axis away from said open end and the distal end of the finger has on its inner side a projection to engage a feature on the tube and on its outer side an axially facing abutment directed towards the open end of the throughway to engage with the stop face and a further radially facing abutment to constrain the distal end of the finger against radial outward movement and thereby to prevent release of the projection on the finger from the feature on the tube and release of the tube from the coupling body. In one particular arrangement, the collet has an extension projecting from the open end of the coupling body and formed with an annular head overlying the end of the coupling body around the open end of the throughway. The head can be depressed towards the end of the coupling body to release the first abutment of the collet finger from the stop face on the coupling body to allow the tube to be extracted from the coupling body.

[0003] EP-A-597711 discloses a tube coupling comprising a coupling body having a throughway open at one end to receive a tube. A first collet is mounted in the throughway tube grip, the tube and extraction of the tube from the throughway. A cap is mounted to extend over the open end of the coupling body to house a second collet arranged head to head with the first collet. The second collet is engageable with an annular abutment on the tube to retain the tube in the coupling body. A single release means in the form of plunger elements is provided on the cap to act on the collets to allow release of the tube in the coupling body.

[0004] GB-A-1599285 discloses a one piece collet for use in a tube coupling body formed on a plastics moulding. The collet has a substantially annular support portion having integral actually extending arms the end portions of which are provided with radially inwardly extending collet teeth. The plastics collet is formed in a mole having a separation plane extending diametrically through the collet teeth.

[0005] This invention provides a collet for locating a tube in a throughway of a coupling body, the collet including an annular flange having a central opening for a tube and a plurality of axially extending arms each having a detent at its distal end for locking between the coupling body and tube, wherein a plurality of slots are pro-

vided in the annular flange corresponding in profile to axial projections of the detent profiles on the annular flange for elements of the tooling required for moulding the sides of the detents adjacent the annular flange to extend through said slots during the moulding operation.

[0006] In one arrangement according to the invention the arms of the collet extend axially from the annular flange at spaced locations around the central opening and the arcuate slots are formed in the flange on the outside of the arms opposite the detents at the distal ends of the arms.

[0007] In an alternative arrangement the axially extending arms are formed integrally with a sleeve or collar and legs extend axially from the sleeve between the arms and said annular flange is formed integrally with the ends of the legs which are spaced around the central opening in the flange and the slots in the flange are formed around the opening between the legs opposite the detents on the arms for tooling to form the faces of the detents adjacent the annular flange.

[0008] In the latter case the annular flange may have an integral sleeve encircling the collet to extend outside the coupling body for manual movement of the collet between locking and released positions.

[0009] The following is a description of some specific embodiments of the invention, reference being made to the accompanying drawings in which :

Figure 1 is a sectional view through a tube coupling having a coupling body and tube locking collet;
Figure 2 is a sectional view through a part of the coupling body with a collet removed;
Figure 3 is an end view of the collet;
Figure 4 is a sectional view through the collet;
Figure 5 is a sectional view through a further form of tube coupling in accordance with the invention;
Figure 6 is a sectional view through the coupling body of the tube coupling of Figure 5;
Figure 7 is an end view of the collet for the tube coupling at Figure 5;
Figure 8 is a sectional view of the collet shown in Figure 7;
Figure 9 is a sectional view through a still further form of tube coupling in accordance with the invention; and
Figure 10 shows the collet of Figure 9 with part of the tooling moulding the collet shown in chain line.

[0010] Reference is made firstly to Figures 1 to 4 of the drawings which show a tube coupling indicated generally at 10 comprising a coupling body 11 having a throughway 12 open at one end 13 to receive an end portion of a tube not shown. An "O" ring seal 14 is mounted in the throughway for sealing engagement with the outer surface of the tube. A collet indicated generally at 15 is located in the open end of the throughway for locking the tube in the throughway. The collet comprises an annular sleeve or collar 16 having a central opening 17

and four equi-spaced resilient arms 18 formed integrally with the collar extending axially into the throughway. The arms have distal ends formed with enlarged heads 19 the inner sides of which have inwardly projecting teeth 20 to engage an annular abutment or recess formed on the tube to be locked in the coupling body. The outer sides of the arms have inclined cam faces 21 on the sides adjacent the collar.

[0011] The part of the coupling body adjacent the open end 13 is formed with four rectangular shaped ports 22 spaced around the throughway to receive the respective heads of the collet. The inclined cam surfaces 21 on the heads of the collet engage the sides 23 of the ports nearest the open end of the coupling body and movement of the collet outwardly of the throughway causes the cam faces 21 to drive the distal ends of the collet radially inwardly of the throughway to lock the teeth 20 on the inner sides of the collet arms firmly in engagement with the abutment or recess in the tube, thereby locking the tube in the coupling body.

[0012] The collar or sleeve 16 of the collet extending out of the throughway is formed with an encircling integral annular flange 24 which is spaced from the end of the coupling body 11 when the detents of the collet arms are in locking engagement with a tube in the coupling body, as indicated in Figure 1. To release the detents, the flange 24 of the collet is depressed towards the collet body and this disengages the cam faces 21 of the collet arms from the sides 23 of the ports in the coupling body and allows the heads of the collet arms to be displaced outwardly into the ports thereby allowing the tube to be extracted from the collet and coupling body. Equally, when engaging a tube in the coupling body, the flange 24 of the collet can be drawn outwardly once the tube has been inserted to drive the heads of the collet arms inwardly by engagement of the cam faces 21 with the faces 23 of the ports 22 thereby locking the teeth 20 firmly in engagement with the tube.

[0013] For ease of moulding the collet and in particular the faces 21 of the heads of the collet the flange 24 of the collet is formed with arcuate slots 25 which correspond in profile to axial projections of the cam faces 21 on the flange 24. Thus one part of the tooling can include elements which extend through the slots 25 to form the cam faces 21. As a result, the collet can be formed between two axially separable tool components without the need for any component having to collapse or move radially for extraction of the moulding from the tooling.

[0014] Figures 5 to 7 show a further form of collet in accordance with the present invention suitable for use in the tube coupling described and illustrated in EP-A-0756125. Like parts have been given the same reference numerals. In the embodiment described above, the annular collar or sleeve of the collet was located outside the coupling body and the resilient arms 18 of the collet extended axially into the coupling body. In the embodiment of Figures 5 to 8, the collar or sleeve is located

within the coupling body and the resilient legs 18 of a collet project towards the open end of the coupling body. The arms have detent heads 19 formed with inwardly projecting teeth 20 to engage the tube and outwardly projecting stepped abutments 26 to engage in the ports 22 formed in the coupling body 11. Reference should be made to my European Patent Publication No. 0756125 for a more detailed description of the operation of the detents.

[0015] Between the resilient arms 18, the collar or sleeve 16 has axially extending legs 27 which project from the open end 13 of the coupling body and are formed integrally with an outer annular flange 28 corresponding to the annular flange 24 of the first embodiment. The flange has a central opening 29 for a tube to be inserted through the collet into the coupling body and has arcuate slots 30 at spaced locations around the flange disposed opposite the heads 19 of the collet arms for access for tooling to form the faces of the heads directed towards the flange 28. Thus, again, the collet can be formed between relatively simple two-part tooling which is axially separable.

[0016] Figures 9 and 10 show a variant of the collet of Figures 5 to 8 in which the flange 28 has an integral skirt or sleeve 31 which extends around the part of the coupling body adjacent the open end in which the ports 22 are formed and provides a hand hold for easy manipulating of the collet between its released and engaged positions as illustrated.

[0017] Figure 10 of the drawings show part of the mould tooling for forming the collet of Figure 9, illustrated at 32, and the centre line 33 depicts the split line of the mould.

Claims

1. A collet for locating a tube in a throughway of a coupling body, said collet (15) including an annular flange (24) having a central opening (17) for a tube and a plurality of axially extending arms (18), each having a detent (19) at its distal end for locking between the coupling body and tube; characterised in that a plurality of slots (25) are provided in the annular flange, corresponding in profile to axial projections of the detent profiles (21) on the annular flange, for elements of the tooling required for moulding the sides of the detents adjacent the annular flange to extend through said slots (25) during the moulding operation.
2. A collet as claimed in claim 1, characterised in that the arms (18) of the collet extend axially from the annular flange (24) at spaced locations around said central opening (17) and the arcuate slots (25) are formed in the flange on the outside of the arms opposite the detents (21) at the distal ends of the arms.

3. A collet as claimed in claim 1, characterised in that the axially extending arms (18) are formed integrally with a sleeve or collar (16) and legs (27) extend axially from the sleeve between the arms (18) and said annular flange (24) is formed integrally with the ends of the legs which are spaced around the central opening (17) in the flange and the slots in the flange are formed around the opening between the legs opposite the detents on the arms for tooling to form the faces of the detents adjacent the annular flange.
4. A collet as claimed in claim 3, characterised in that said annular flange (24) has an integral sleeve (31) encircling the collet (15) to extend outside the coupling body for manual movement of the collet between locking and released positions.

Patentansprüche

1. Hülse zum Plazieren eines Rohrs in einem Durchlaß eines Kupplungskörpers, wobei die Hülse (15) einen ringförmigen Flansch (24) mit einer Mittenöffnung (17) für ein Rohr und eine Anzahl sich axial erstreckender Arme (18) aufweist, von denen jeder eine Rasteinrichtung (19) an seinem distalen Ende zum Verriegeln zwischen dem Kupplungskörper und dem Rohr aufweist, dadurch **gekennzeichnet**, daß eine Anzahl von Schlitzen (25) in dem ringförmigen Flansch vorgesehen sind, die in ihrem Profil axialen Vorsprüngen der Rastprofile (21) auf dem ringförmigen Flansch entsprechen, für Elemente des Formwerkzeugs, das für das Formen der Seiten der Rasteinrichtungen angrenzend an den ringförmigen Flansch erforderlich ist, um sich während des Formvorgangs durch die Schlitze zu erstrecken.
2. Hülse nach Anspruch 1, dadurch **gekennzeichnet**, daß die Arme (18) der Hülse sich axial vom ringförmigen Flansch (24) an beabstandeten Positionen um die Mittenöffnung (17) erstrecken und die bogenförmigen Schlitze (25) in dem Flansch an der Außenseite der Arme gegenüberliegend den Rasteinrichtungen (21) an den distalen Enden der Arme gebildet sind.
3. Hülse nach Anspruch 1, dadurch **gekennzeichnet**, daß die sich axial erstreckenden Arme (18) einstückig mit einer Buchse oder einem Kragen (16) gebildet sind, und Beine (27) sich axial von der Buchse zwischen den Armen erstrecken und der ringförmige Flansch (24) einstückig mit den Enden der Beine gebildet ist, die um die Mittenöffnung (17) in dem Flansch beabstandet sind und die Schlitze in dem Flansch um die Öffnung zwischen den Beinen gegenüber den Rasteinrichtungen auf den Armen für

Werkzeuge zur Formung der Flächen der Rasteinrichtungen angrenzend an den ringförmigen Flansch gebildet sind.

4. Hülse nach Anspruch 3, dadurch **gekennzeichnet**, daß der ringförmige Flansch (24) eine einstückige Buchse (31) aufweist, die die Hülse (15) umgibt, um sich nach außen des Kupplungskörpers für eine manuelle Bewegung der Hülse zwischen einer Verriegelungs- und einer Freigabeposition zu erstrecken.

Revendications

1. Douille pour le positionnement d'un tube dans un passage d'un corps d'accouplement, ladite douille (15) comprenant un rebord annulaire (24) ayant une ouverture centrale (17) pour un tube et plusieurs bras (18) s'étendant axialement, ayant chacun un organe d'arrêt (19) à son extrémité distale pour réaliser un verrouillage entre le corps d'accouplement et le tube ;
caractérisée en ce que plusieurs fentes (25) sont prévues dans le rebord annulaire, correspondant en profil à des saillies axiales des profils (21) des organes d'arrêt sur le rebord annulaire pour des éléments de l'outillage nécessaires pour mouler les côtés des organes d'arrêt adjacents au rebord annulaire de manière qu'ils s'étendent à travers lesdites fentes (25) pendant l'opération de moulage.
2. Douille selon la revendication 1,
caractérisée en ce que les bras (18) de la douille s'étendent axialement depuis le rebord annulaire (24) en des emplacements espacés autour de ladite ouverture centrale (17) et les fentes incurvées (25) sont formées dans le rebord sur le côté extérieur des bras en opposition aux organes d'arrêt (21) aux extrémités distales des bras.
3. Douille selon la revendication 1,
caractérisée en ce que les bras (18) s'étendant axialement sont formés d'une seule pièce avec un manchon ou une bague (16) et des branches (27) s'étendent axialement depuis le manchon entre les bras (18), et ledit rebord annulaire (24) est formé d'une seule pièce avec les extrémités des branches qui sont espacées autour de l'ouverture centrale (17) dans le rebord et les fentes situées dans le rebord sont formées autour de l'ouverture entre les branches en opposition aux organes d'arrêt sur les bras pour que l'outillage forme les faces des organes d'arrêt adjacents au rebord annulaire.
4. Douille selon la revendication 3,
caractérisée en ce que ledit rebord annulaire (24) est réalisé d'une seule pièce avec un manchon

(31) entourant la douille (15) de façon à s'étendre à l'extérieur du corps d'accouplement pour un mouvement manuel de la douille entre des positions de verrouillage et de libération.

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